

1-20. (CANCELED)

21. (CURRENTLY AMENDED) A method for generating cold and heat by magnetic effect comprising the steps of:

circulating a mixture of transmitting fluid containing particles comprising of one or more of a magneto-calorific material, a phase-change material, a superconductive material, and a mixture of such materials, through a principal circuit (13) having a single first heat exchanger (11) and a single second heat exchanger (12) connected in series;

generating a magnetic field in the first heat exchanger (11) using magnetic elements (14) associated with the first heat exchanger (11);

situating magnetically isolating the second heat exchanger (12) outside from the magnetic field in the first heat exchanger; and,

thermally isolating the mixture flowing from the first heat exchanger to the second heat exchanger from the mixture flowing from the second heat exchanger to the first heat exchanger, whereby

in order for the particles [[to]] undergo a temperature increase when the particles pass through the magnetic field in the first heat exchanger and undergo cooling when the particles leave the magnetic field and pass through the second heat exchanger;

extracting heat from the first heat exchanger (11) by means of a hot circuit (15);  
and

extracting cold from the second heat exchanger (12) using a cold circuit (16).

22. (PREVIOUSLY PRESENTED) The method according to claim 21, further comprising the step of providing the transmitting fluid in one of a liquid or gas state.

23. (PREVIOUSLY PRESENTED) The method according to claim 21, further comprising the step of providing the transmitting fluid as a heat-transmitting liquid.

24. (PREVIOUSLY PRESENTED) The method according to claim 21, further comprising the step of providing the transmitting fluid as a nano-fluid.

25. (PREVIOUSLY PRESENTED) The method according to claim 21, further comprising the step of providing the transmitting fluid as a suspension.

26. (PREVIOUSLY PRESENTED) The method according to claim 21, further comprising the step of providing the transmitting fluid as a multi-functional type of fluid.

27. (PREVIOUSLY PRESENTED) The method according to claim 21, further comprising the step of providing the particles of magneto-calorific material as one single material.

28. (PREVIOUSLY PRESENTED) The method according to claim 21, further comprising the step of providing the particles as generally spherical in shape with an average dimension range of 10  $\mu\text{m}$  to 1000  $\mu\text{m}$ .

29. (PREVIOUSLY PRESENTED) The method according to claim 21, further comprising the step of providing the particles as having different shapes and dimensions.

30. (PREVIOUSLY PRESENTED) The method according to claim 21, further comprising the step of insulating the second heat exchanger (12) from the magnetic field generated in the first heat exchanger (11).

31. (PREVIOUSLY PRESENTED) The method according to claim 21, further comprising the step of circulating the mixture from the principal circuit (13) and one or more of the mixture from the hot circuit (15) and the cold circuit (16) in opposite directions, respectively, through the first and the second heat exchanger (11, 12, respectively).

32. (CURRENTLY AMENDED) A method of generating cold and heat by magneto-calorific effect comprising the steps of;

circulating a mixture of heat-transmitting fluid and particles comprising at least a superconductive material in a principal circuit (13) having a single first heat exchanger (11) connected to a single second heat exchanger (12);

generating a magnetic field in the first heat exchanger (11) by magnetic elements (14) associated with the first heat exchanger (11);

magnetically isolating the second heat exchanger (12) from the magnetic field in the first heat exchanger (11);

thermal isolating the mixture flowing from the first heat exchanger (11) to the second heat exchanger (12) from the mixture flowing from the second heat exchanger (12) to the first heat exchanger (11);

circulating the mixture in the ~~second~~ first heat exchanger ~~[[ (12) ]]~~ (11) ~~which is located outside the magnetic field~~ so the particles of superconductive material undergo

a rise in temperature when the particles of superconductive material pass through the magnetic field ~~to heat the mixture~~ in the first heat exchanger (11);

cooling the mixture in the second heat exchanger (12) with the particles of superconductive material which undergo cooling ~~[[when]]~~ after leaving the magnetic field in the first heat exchanger (11);

extracting heat from the first heat exchanger (11) using at least one hot circuit (15); and

extracting cold from the second heat exchanger (12) using at least one cold circuit (16).

33. (CURRENTLY AMENDED) A device for generating cold and heat by magnetic effect comprising at least one heat exchanger, the device comprising:

a principal circuit (13) comprising a single first heat exchanger (11) and a single second heat exchanger (12) connected in series through which circulates a mixture of transmitting fluid containing particles comprising one or more of a magneto-calorific material, a phase-change material, a superconductive material, or a mixture of such materials.

magnetic elements (14) for generating a magnetic field in the first heat exchanger (11),

the second heat exchanger (12) being magnetically isolated from the magnetic field in the first heat exchanger (11), and

the mixture flowing from the first heat exchanger (11) to the second heat exchanger (12) being thermally isolated from the mixture flowing from the second heat exchanger (12) to the first heat exchanger (11), so that

the particles undergo a rise in temperature when passing through the magnetic field in the first heat exchanger (11) and undergo cooling ~~upon leaving the magnetic field~~ in the second heat exchanger (12);

a hot circuit (15) connected to the first heat exchanger (11); and

at least one cold circuit (16) connected to the second heat exchanger (12).

34. (PREVIOUSLY PRESENTED) The device according to claim 33, wherein the magnetic elements (14) comprise permanent magnets.

35. (PREVIOUSLY PRESENTED) The device according to claim 33, wherein the magnetic elements (14) comprise electromagnets.

36. (PREVIOUSLY PRESENTED) The device according to claim 33, wherein the magnetic elements (14) are designed to generate a variable magnetic field.

37. (CURRENTLY AMENDED) ~~The device according to claim 33~~ A device for generating cold and heat by magnetic effect comprising at least one heat exchanger, the device comprising:

a principal circuit (13) comprising a first heat exchanger (11) and a second heat exchanger (12) connected in series through which circulates a mixture of transmitting fluid containing particles comprising one or more of a magneto-calorific material, a phase-change material, a superconductive material, or a mixture of such materials.

magnetic elements (14) for generating a magnetic field in the first heat exchanger (11) so that the particles undergo a rise in temperature when passing through the magnetic field and undergo cooling upon leaving the magnetic field;

a hot circuit (15) connected to the first heat exchanger (11); and

at least one cold circuit (16) connected to the second heat exchanger (12).

wherein

the first heat exchanger (11) comprises an exterior envelope (11a) and interior conduits (11b), the interior conduits (11b) serving as vehicles for a heat-transmitting fluid (15a) from the hot circuit (15) and submerged in the mixture of transmitting fluid and particles (13a) from the principal circuit (13), the magnetic elements (14) constitute at least a portion of the exterior envelope (11a) of the heat exchanger (11).

38. (CURRENTLY AMENDED) ~~The device according to claim [[33]] 37, wherein the first heat exchanger (11) comprises an exterior envelope (11a) and interior conduits (11b), the interior conduits (11b) serving as vehicles for a heat-transmitting fluid (15a) from the hot circuit (15) and submerged in the mixture of transmitting fluid and particles (13a) from the principal circuit (13), the magnetic elements (14) constitute a first portion of the exterior envelope (11a) of the heat exchanger[[,]] and a second portion of the exterior envelope (11a) of the heat exchanger (11) is formed consisting of a tube (11c) concentric to the magnetic elements (14).~~

39. (CURRENTLY AMENDED) ~~The device according to claim 33~~ A device for generating cold and heat by magnetic effect comprising at least one heat exchanger, the device comprising:

a principal circuit (13) comprising a first heat exchanger (11) and a second heat exchanger (12) connected in series through which circulates a mixture of transmitting fluid containing particles comprising one or more of a magneto-calorific material, a phase-change material, a superconductive material, or a mixture of such materials.

magnetic elements (14) for generating a magnetic field in the first heat exchanger (11) so that the particles undergo a rise in temperature when passing through the magnetic field and undergo cooling upon leaving the magnetic field;

a hot circuit (15) connected to the first heat exchanger (11); and

at least one cold circuit (16) connected to the second heat exchanger (12),

wherein

the first heat exchanger (11) comprises an exterior envelope (11a) and interior conduits (11b), the interior conduits (11b) serving as vehicles for a heat-transmitting fluid (13a) from the principal circuit (13) and submerged in a transmitting fluid (15a) from the hot circuit (15), the magnetic elements (14) constitute at least a portion of walls of the interior conduits (11b).

40. (CURRENTLY AMENDED) ~~The device according to claim [[33]] 39, wherein the first heat exchanger (11) comprises an exterior envelope (11a) and interior conduits (11b), the interior conduits (11b) serving as vehicles for a heat-transmitting fluid (13a) from the principal circuit (13) and submerged in a transmitting fluid (15a) from the hot circuit (15); the magnetic elements (14) constitute a first portion of the walls of the interior conduits (11b) of the heat exchanger (11)[[,]] and a second portion of the walls of the interior conduits (11) is formed comprising of tubes (11d) concentric to the magnetic elements (14) and located inside the magnetic elements (14).~~